Wheat Straw

REFERENCE MATERIAL

Pedigree

Location: Jefferson County, ID
Class: Classic Hard White
Harvested: 2014

Received at INL: 2015
Sample Preparation: Ground to pass through a 2-inch sieve using a Vermeer BG480 grinder followed by a 1-inch sieve using a Bliss Hammermill

Composition

Table 1. *Chemical composition[a] of Reference Wheat Straw*

%Structural Ash	%Extractable Inorganics	%Structural Protein	%Extractable Protein	%Water Extracted Glucan[b]
5.50	3.37	3.07	1.19	1.56
%Water Extracted Xylan[b]	**%Water Extractives Others**	**%EtOH Extractives**	**%Lignin**	**%Glucan**
0.92	4.76	2.76	16.27	32.24
%Xylan	**%Galactan**	**%Arabinan**	**%Acetic Acid**	**%Total**
16.95	1.60	3.17	1.70	95.05

[a]Determined using NREL "Summative Mass Closure" LAP (NREL/TP-510-48087)

[b]Determined by HPLC following an acid hydrolysis of the water extractives

Proximate, Ultimate & Calorimetry

Table 2. *Proximate, ultimate, and calorific values for Reference Wheat Straw (reported on a dry basis)*

Proximate[a]			Ultimate[b]					Calorimetry[c]	
%Volatile	%Ash	%Fixed Carbon	%Hydrogen	%Carbon	%Nitrogen	%Oxygen	%Sulfur	HHV	LHV
77.04	9.07	13.89	5.90	45.02	1.06	38.82	0.12	7742	6333

[a]Proximate analysis was done according to ASTM D 5142-09

[b]Ultimate analysis was conducted using a modified ASTM D5373-10 method (Flour and Plant Tissue Method) that uses a slightly different burn profile. Elemental sulfur content was determined using ASTM D4239-10, and oxygen content was determined by difference

[c]Heating values (HHV, LHV) were determined with a calorimeter using ASTM D5865-10

Elemental Ash

Table 3. *Elemental ash composition[a] of Reference Wheat Straw*

%Al as Al_2O_3	%Ca as CaO	%Fe as Fe_2O_3	%K as K_2O	%Mg as MgO	%Mn as MnO	%Na as Na_2O	%P as P_2O_5	%Si as SiO_2	%Ti as TiO_2	%S as SO_3
2.77	10.83	2.99	15.45	2.69	0.07	1.16	2.15	58.16	0.11	2.34

[a]Determined as described in ASTM standards D3174, D3682 and D6349

Particle Characteristics

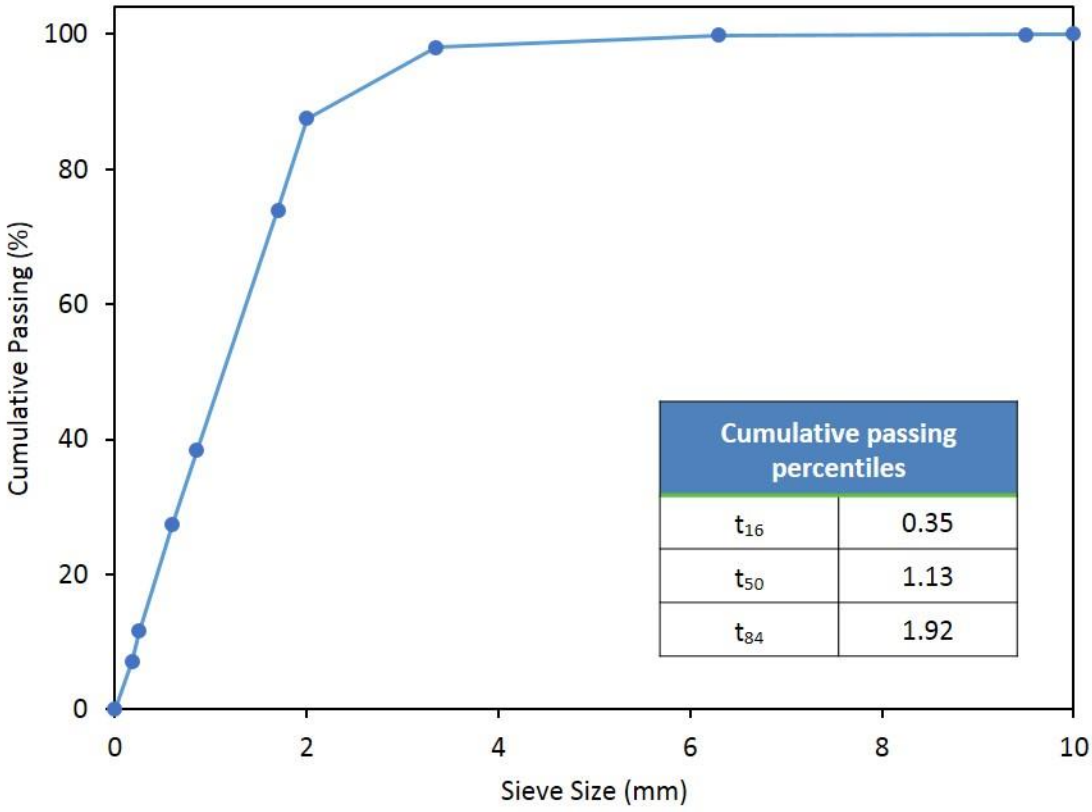

Figure 1. *Cumulative passing percent of 1-inch Reference Wheat Straw determined according to ANSI/ASAE S319.4 using a Ro-Tap test sieve shaker (Model RX-29, W.S. Tyler) and a 15 minute total sieving time. The cumulative passing percentile sieve sizes (e.g., t_{16}) were calculated by interpolation and represent theoretical sieve sizes that would retain 16, 50 or 84% of the particles by mass.*

Contact

For questions regarding biomass material or analytical data please contact Dr. Garold Gresham at garold.gresham@inl.gov or 208-526-6684.